the same time causes a record from an automatic tuning-fork interrupter to be imprinted side by side on the photographic plate. In Dr. Stein's second paper, he describes the use of a small Deprez electromotor to drive a small fan, by which warm, dry air is caused to circulate round a Holtz machine, which by this means is always ready for action. In some historical notes by Herr Holthof, dealing with the early stages of telegraphy, there comes out the interesting point that, so early as 1854, an important improvement had been made in the suggestion of Bourseul for an electric telephone. An anonymous writer, signing himself "L." in the pages of "Didaskalia," gave in that year, under the title of "Elektrische Telephonie," an account of Bourseul's crude notion, and added something not to be found in Bourseul's suggestion, namely, the use of an electromagnet in the receiver to actuate the disk of thin metal to which the listener was to apply his ear; the description of the instrument—which, it seems, never reached anything beyond an anonymous suggestion—reads like a description of a Bell telephone, of which it is a remarkable foreshadowing. It is remarkable that Reis, who was at that time resident in Frankfort, should, when using an electromagnet in his subsequently invented telephone, have stopped short of the use of a disk in his receiver in place of the bar armature he employed. It is pretty clear he did not know of "L.'s" suggestion. The remainder of the papers in the "Year-book" deal chiefly with telegraphic and fire-alarm apparatus. The Frankfort Society is to be congratulated on the value of the papers communicated to it during its short existence.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.*]

What are the Saccopharyngoid Fishes?

IN December of last year M. Vaillant communicated to the French Academy of Sciences a notice of a remarkable deep sea fish, to which he gave the name *Eurypharynx pelecanoides*. He was in great doubt as to the relations of this form, but concluded that "of all fishes it is to *Malacosteus niger*," placed in the family Scopelidæ by zoologists, that he was most inclined to approximate the new type. Five specimens of a nearly related form, to which Mr. J. A. Ryder and myself have given the name *Gastrostomus bairdii*, were obtained by the United States Fish Commission steamer *Albatross*, in the summer and autumn of the present year. The largest of these specimens is nearly two feet long, and an anatomical investigation reveals some very remarkable peculiarities of structure, which have caused Mr. Ryder and myself to differentiate the two forms, Gastrostomus and Eurypharnyx, in a distinct order of fishes to which we have given the name Lyomeri.

The Lyomeri are fishes with five branchial arches (none modified as branchiostegal or pharyngeal) far behind the skull; an imperfectly ossified cranium, deficient especially in nasal and vomerine elements, articulating with the first vertebra by a basi-occipital condyle alone; with only two cephalic arches, both freely movable, (1) an anterior dentigerous one, the palatine, and (2) the suspensorial, consisting of the hyomandibular and quadrate bones; without opercular elements; without maxillary bones, or distinct posterior bony elements to the mandible, with the scapular arch imperfect (limited to a single cartilaginous plate) and remote from the skull; and with separately ossified but imperfect vertebræ. Whether other than the two genera mentioned, Eurypharynx and Gastrostomus, belong to this order is not entirely certain, but there is little doubt, in the opinion of Mr. Ryder and myself, that the family Saccopharyngidæ also belongs to the order, and it is for the purpose of calling attention to this doubtful and still little known type, that in behalf of Mr. Ryder and myself I address the present communication. No satisfactory information has been given as to the Saccopharyngidæ, except by Dr. Mitchill in 1824, and by Dr. Harwood in the *Philosophical Transactions* for 1827. The plate published in the volume cited represents the head of Ophiognathus with the mouth closed as well as open, and the differences in the relation of the posterior angles of the mouth to the axis indicate that Ophiognathus (as well as Saccopharynx) has a movable suspensorium, and would therefore exhibit the Lyomerous peculiarity of structure. It appears from Dr. Günther's "Catalogue of the Fishes in the British Museum" (vol. viii. p. 22), that in 1870 there were two specimens of a Saccopharyngoid fish—probably the *Ophiognathus ampullaceus*—in the British collection. (It is possible that the so-called young mentioned in the Catalogue may be a Eurypharyngoid.) The question whether that species belongs to the Lyomeri can therefore be readily settled negatively or affirmatively. Assuming that the family Saccopharyngidæ belongs to the order, the two families would apparently be distinguishable as follows:—

The Eurypharyngidæ are Lyomeri with the branchio-anal portion much shorter than the rostro-branchial; with the tail very elongated and moderately attenuated backwards; with the head flat above and with a transverse rostral margin, at the outer angles of which the eyes are exposed; with the palatine jaws excessively elongated backwards and the upper parallel, and closing against each other as far as the articulation of the two suspensorial bones; with minute teeth on both jaws; the dorsal and anal fins well developed, and continued nearly to the end of the tail, and with minute narrow pectoral fins.

The Saccopharyngidæ appear to be Lyomeri with the branchio-anal portion much longer than the rostro-branchial; the tail excessively elongated and attenuated; the cranium unknown; the eyes antero-lateral; with the palatine bones moderately extended backwards (in comparison with the Eurypharyngidæ), and apparently not closable against each other; with enlarged teeth in one or both jaws; with the dorsal and anal fins feebly developed, and with pectorals small but broad. Saccopharynx is considered by Dr. Günther to consist of "deep-sea congers," but evidently it is not at all related to the congers or any other allied fishes.

I can assure English naturalists that no type of fishes will more fully reward investigation than the Saccopharyngidæ, and it is to be hoped that some master of applied anatomy, like Profs. Huxley or Lankester, may deem an examination of the specimens in the British Museum worthy of their attention. A few of the many remarkable peculiarities of organisation of the type have been described in an article "On the Anatomy and Relations of the Eurypharyngidæ," by Theodore Gill and John A. Ryder, in the *Proceedings* of the United States National Museum for 1883 (pp. 262-273), and a full monograph will appear later. May we hope for information respecting Saccopharynx in time to correlate it with that on Gastrostomus? THEO. GILL

Cosmos Club, Washington, December 18, 1883

The Mildness of the Season

As the flowering of plants at this time of the year is perhaps the best indication of the mildness of the season, I send you a list of the plants from which I and a friend gathered one or more flowers on the 24th and 26th inst. I have given the list of each day's gathering separately. Those on the 24th were gathered between this city and Hinton Charterhouse, once noted for its Carthusian monastery. Those of the 26th were gathered between Bath and Bradford-on-Avon, a very old town which contains the remains of a Saxon church and one of the finest tithe barns in England. VIATOR

Bath, December 27, 1883

List of Plants from which Flowers were gathered on December 24

Draba verna (Spring Whitlow Grass)
Primula acaulis (Primrose)
Veronica officinalis (Com. Speedwell)
Bellis perennis (Daisy)
Centaurea scabiosa (Greater Knapweed)
Ulex europæus (Com. Furze)
Achillea millefolium (Com. Yarrow)
Crepis virens (Smooth Hawk's Beard)
Lamium album (White Deadnettle)
Fragaria vesca (Wood Strawberry)

Gathered on December 26

Ranunculus repens (Creeping Crowfoot)
Cheiranthus cheiri (Com. Wallflower)

Cerastium semidecandrum (Little Mouse-Ear Chickweed)
,, *triviale* (Lesser do.)
Arenaria tenuifolia (Fine leaved Sandwort)
Pimpinella saxifraga (Com. Burnet Saxifrage)
Pastinaca sativa (Wild Parsnip)
Torillis anthriscus (Upright Hedge Parsley)
Senecio vulgaris (Com. Groundsel)
,, *sylvaticus* (Mountain do.)
Crepis virens (Smooth Hawk's Beard)
Hypochæris radicata (Long-rooted Cat's Ear)
Taraxacum dens-leonis (Dandelion)
Veronica hederifolia (Ivy-leaved Speedwell)
,, *polita* (Gray Procumbent do.)
,, *agrestis* (Green do. do.)
Lamium purpureum (Red Deadnettle)
,, *album* (White do.)
Rumex crispus (Curled Dock)

River Thames—Abnormal High Tides

IN a letter in NATURE of November 2, 1882 (p. 6), I gave a review of exceptional tides from 1860, and attempted to trace the causes thereof; it appeared that from 1860 to 1868 inclusive the computed maximum rise above "Trinity Standard" of high water for spring tides was 6 inches, and the actual range excess was 3 feet 6 inches above that standard.

From 1869 to 1882 the greatest computed elevation at high water was 2 feet 1 inch, and the maximum rise 5 feet above "Trinity" at Westminster, viz. on January 18, 1881, and again on October 28, 1882, the same height was attained—in each case resultant on a great north-east gale. On November 14, 1882, the afternoon tide marked 2 feet 5 inches above "Trinity," or 2 feet 4 inches above computed height—resultant again on a north-north-east gale. Since then, during the last thirteen months, there have been no very exceptional tides until last springs.

The following abstract table gives the more salient results for the present year:—

High Waters referred to "Trinity"

1883		Computed	Observed	Difference	Wind
		′ ″	′ ″	′ ″	
Jan.	22 p.m.	... 0 7 below	... 1 0 above	... 1 7	... E.N.E.
,,	24 ,,	... 0 2 above	... 1 6 below	... 1 8	... S.
Feb.	9 ,,	... 1 6 ,,	... 1 6 above	... Equal	... W.N.W.
,,	12 ,,	... 1 1 ,,	... 2 6 ,,	... 1 5	... S.S.W. to S.[2]
,,	13 ,,	... 0 1 ,,	... 2 0 ,,	... 1 11	... W.S.W.[1]
Mar.	12 a.m.	... 2 0 ,,	... 3 8 ,,	... 1 8	... N.N.W.
April	21 p.m.	... 0 6 below	... 1 0 ,,	... 1 6	... E.N.E.
June	8 ,,	... 0 5 above	... 1 6 ,,	... 1 1	... E.N.E.
Sept.	3 ,,	... 0 6 ,,	... 0 6 below	... 1 0	... W.S.W.[2]
,,	5 ,,	... 0 2 ,,	... 1 6 above	... 1 4	... N.N.W.
Oct.	1 ,,	... 0 2 ,,	... 1 6 ,,	... 1 4	... N.
,,	4 ,,	... 0 1 ,,	... 2 0 ,,	... 1 11	... N.N.W.[2]
,,	16 ,,	... 1 2 ,,	... "Trinity"	... 1 2	... W.S.W.[2]
Nov.	5 ,,	... 1 1 below	... "Trinity"	... 1 1	... W.N.W.
,,	6 ,,	... 1 9 ,,	... 0 6 below	... 1 3	... W.[2]
,,	19 ,,	... 0 1 ,,	... 1 6 above	... 1 7	... W.
,,	29 ,,	... 0 8 ,,	... 0 8 ,,	... 1 4	... S.S.E.
,,	30 ,,	... 0 5 ,,	... 1 0 ,,	... 1 5	... W.
Dec.	1 ,,	... 0 3 ,,	... 1 9 ,,	... 2 0	... N.N.W.
,,	12 midnight	0 5 ,,	... 3 6 ,,	... 3 11	... W.N.W.[2]
,,	16 a.m.	... 1 1 above	... 3 8 ,,	... 2 7	... N.[1]

[1] A gale. [2] A great gale.

It will be observed that in the majority of cases northerly winds accompany or have preceded the exceptionally high tides; also how a great westerly gale blowing down the river depresses the range of tide. The most remarkable result is that attendant on the great gale of the 12th inst. during last springs, for although high water level was less by 18 inches than in January, 1881, and October, 1882, it was exceptional for its great rise over the computed elevation, being no less than 3 feet 11 inches above the height denoted in the Admiralty tide tables with the reservation before named in my former letter, that the computed heights are for London Bridge. The high water of October 28, 1882, was 3 feet 4 inches above computed height; but the very remarkable tide of January 18, 1881, was actually 5 feet above the estimated range, which was only level with "Trinity Standard." The afternoon tide of Sunday, the 16th inst., was also, it will be seen, very much increased by the northerly gale then prevailing. J. B. REDMAN

6, Queen Anne's Gate, S.W., December 19, 1883

Deafness in White Cats

REFERRING to the note in your issue of December 13 (p. 164), by Mr. Lawson Tait, on "Deafness in White Cats," I should like to state, if my remarks may not be out of date, that my father kept a breed of deaf white cats over several years; and on making an inquiry regarding these cats of my brother, who now lives in Reading, but who at that time was resident with my father on a farm in North Hampshire, he informs me that the deaf cats were all white with blue eyes, with one single exception, and that one refers to an aged mother who was named "Deaf," on account of her infirmity, and who had eyes of different colours, the one being "red," or pink, as seen in white rabbits, and the other blue. So remarkable was the appearance of this cat that the eyes often attracted the attention of visitors, and my brother has more than once related to me a circumstance which I should not mention here, save that it so thoroughly bears on this question as one of fact. On one occasion a neighbour, remarking on the ocular peculiarities of this cat, elicited from my father the jocular reply that "she had one eye for the rats, and another for the mice." My brother further states that these deaf cats were all females, and that the breed was preserved on account of its furnishing "good mousers." I apprehend that this characteristic may in some measure be attributed to the character of the eyes enabling the animals to see better in obscure light. Males were not preserved, because they became rovers and destroyed the game. When any of the offspring were pied, or otherwise coloured, they were not deaf. Bearing on this, and evidently referable to my brother's early associations, he once observed, in his walks round Reading, a white cat with blue eyes sitting at a cottage door, and on inquiring he found that the animal was deaf; but he made no observation as to whether it was male or female. JOSEPH STEVENS

Oxford Road, Reading, December 24, 1883

Teaching Animals to Converse

I HAVE read with interest Sir John Lubbock's communication (p. 216), but I would like to know whether any precautions were taken to find out whether "Van" selected the right card by his sense of sight or by scent? This could have been easily done by changing the card for a facsimile which had not been previously scented. A more thorough test would be to employ a set of cards with "Food" written on one side of each and some other word on the other, then putting the cards in cases with an opening exposing one word only. The cards could then be put in a row and be kept in the same relative position, the changes for the experiments being made by turning the cards in their cases. Would it not be simpler to commence with drawings on the cards instead of words. For instance, a saucer or biscuit for "Food," a bone for "Bone," a hat for "Out," &c.?

Hanover, January 5 J. S. B.

On the Absence of Earthworms from the Prairies of the Canadian North-West

AN incidental allusion is made by Mr. Christy in NATURE of the 3rd inst. (p. 213) to Darwin's statement that earthworms "abound in Iceland." In 1881 I spent several weeks in that island, and had occasion many times to search for worms as a bait for trout and char around Thingvalla, Ori, the Sog River, &c., and could not obtain them except near the farmhouses—which are at great distances from each other—and absent altogether from the interior of Iceland, which is uninhabited and a desert. RICHARD M. BARRINGTON

Fassaroe, Bray, Co. Wicklow, January 4

Merrifield's "Treatise on Navigation"

I BEG to thank your reviewer of my book for the suggestions he has made in NATURE of December 20 (p. 169), and should like to point out to him that he must have overlooked some remarks contained therein, when he says:—

"We regret that Mr. Merrifield has omitted from the chapter on Traverse Sailing the warning given by Raper, that, especially in high latitudes, the difference of longitude should be found on each course," &c., by Mercator's sailing.

Will you kindly allow me to remark that I mention this twice in my book? First, on pp. 88, 89 I say, "Middle-latitude sailing should not be used in (*a*) high latitudes; (*b*) when the difference